UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/611,766	07/01/2003	Zhijun Xiao	56.0718	2167

27452 7590 06/01/2005

SCHLUMBERGER TECHNOLOGY CORPORATION
IP DEPT., WELL STIMULATION
110 SCHLUMBERGER DRIVE, MD1
SUGAR LAND, TX 77478

EXAMINER	
RICHARD, CHARLES R	

ART UNIT	PAPER NUMBER
1712	

DATE MAILED: 06/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/611,766	XIAO ET AL.	
	Examiner	Art Unit	
	C. R. Richard	1712	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☒ Claim(s) *3,9 and 10* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/6&14/03;1/24/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. For purposes of clarity, Applicant may wish to consider rewording certain portions of the specification into more standard English (see for example, paragraph 17).

2. The Examiner notes that Applicant has made several admissions concerning the prior art such as in paragraphs 25 and 27 of the specification. These may be admissions in the sense that they allow for something working "sometimes".

3. No temperature basis is given for the densities recited in the claims.

Oath/Declaration

4. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective, because it was not executed in accordance with either 37 CFR 1.66 or 1.68. Specifically, the signature of Raymond Joseph Tibbles is not dated. It may be of note that the residence and mailing address given for Mr. Tibbles seems to differ in the declaration that he signed and the one signed by co-inventor, Omar Moussa.

In addition, the Declaration made by Omar Moussa was signed on 7/3/03, two days after filing, yet the box on the first page indicating that it was submitted with the initial filing was checked, as was the one saying that the specification was attached, instead of the application number, etc. Thus, the specification to which the oath or declaration is directed has not been adequately identified. See MPEP § 602.

Given the issues with the Declaration cited, it would be advisable for Applicant to submit a Declaration re-executed by ALL inventors, not just Tibbles and Moussa. Only a re-execution by Tibbles and Moussa will be required here, however.

Specification

5. The disclosure is objected to because of the following informalities. There are extraneous characters at the end of paragraph 34 of the specification. Appropriate correction is required.

Claim Objections

6. Claims 3 and 9-10 are objected to because of the following informalities. These claims recite "mixture thereof" or "mixture therof" which are grammatically incorrect, instead of "mixtures thereof" or something equivalent. Appropriate correction is required.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1-3 and 6-10 are rejected under 35 U.S.C. 102(b) as being anticipated by disclosures in WO98/56497. This reference teaches fracturing fluids and methods of fracturing a subterranean formation therewith (see page 3, lines 5-9).

One method involves pumping a fracturing fluid disclosed through a wellbore and into a formation at sufficient pressure to fracture the formation (see page 3, lines 5-9). The fracturing fluid may comprise an aqueous medium, a zwitterionic surfactant and inorganic salts (see page 2, lines 7-17), and it may also contain a gas such as air, nitrogen or carbon dioxide to provide an energized fluid or foam (see page 6, lines 5-8). The zwitterionic surfactant may be a betaine containing an alkylamidopropyl group where alkyl may be erucyl or oleyl (see page 6, lines 21 to page 7, line 23 and formula V on page 8).

The reference teaches that the inorganic salts will typically be present in only a "minor" amount and gives an example at that point of less than about 20% by weight

(see page 11, lines 23-25). In this context, minor means "less than major" or less than 50% by weight; this is confirmed by the disclosure of up to 30 weight percent inorganic salt being typical (see page 12, lines 31-35). Exemplary salts include water-soluble potassium and sodium salts [potassium bromide, potassium carbonate and sodium bromide would qualify], calcium chloride, calcium bromide and zinc halides. The CRC Handbook gives the density of aqueous 30 weight percent calcium chloride solution at 20 deg C as 1.28g/cm3, that of KBr as 1.26g/cm3, that of NaBr as 1.28 g/cm3 and that of 50 weight percent K2CO3 as 1.54 g/cm3. Perry's Handbook gives the density of aqueous 30 weight percent zinc chloride as 1.29 g/cm3 at 20 deg C, 50 weight percent as 1.57 g/cm3, 30 weight percent zinc bromide as 1.32 g/cm3, 40 weight percent as 1.46 g/cm3 and 50 weight percent as 1.64 g/cm3. Of course, use of a fluid with this amount of salt and accompanying high density would inherently allow for fracturing at comparatively reduced surface pressure.

Note that there is a US equivalent to the cited WO document, US Patent 6,258,859 to Dahayanake et al., which issued/published about 2 and a half years after the WO document cited here.

9. Claims 1-3 and 6-10 are rejected under 35 U.S.C. 102(e) as being anticipated by Fu et al. in US Patent Application Publication 2003/0236174. Fu discloses a high density fracturing fluid and methods for using same.

Fluids according to Fu may comprise a surfactant like erucylamidopropyl betaine [a zwitterionic surfactant] and a salt (such as a chloride or bromide of calcium or zinc or

mixtures of these) forming a brine having a density above about 1.5 g/cm3 (see page 1, paragraphs 7-8); these fluids are useful in oilfield treatment methods like hydraulic fracturing (see page 1, paragraph 15). An oleyl acid amide betaine containing surfactant may also be used (see page 3, paragraphs 33-34). The fluid can be pumped as a liquid, energized or foamed with nitrogen or maybe carbon dioxide or air (see page 5, paragraph 48). Such a high density fluid would inherently allow for fracturing at comparatively reduced surface pressure.

The applied reference has a common assignee and two common inventors with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

10. Claims 1-2 and 4-10 are rejected under 35 U.S.C. 102(e) as being anticipated by England et al. in US Patent Application Publication 2004/0023812. England discloses a high density fracturing fluid and methods for using same.

In particular, England discloses a method of fracturing a formation at reduced surface pressure including injecting into a wellbore a fracturing fluid based on a liquid medium having a density higher than 1.3 g/cm3, and this method may also include adding proppant and energizing the fluid (see Abstract and page 2, paragraph 16). Note

that no specific/required order is given for these steps, so the disclosure is properly taken as disclosing these steps in any order; thus, the fluid may be energized before injection. Also, note that England states that "energized fluid" means at any foam quality with 52% mentioned which is at least 25% and at least 50% (see page 2, paragraph 16). England discloses more specific fracturing fluids such as those based on a liquid medium with density greater than 1.8[g/cm]3 and those comprising a zwitterionic surfactant (such as a betaine containing an oleyl acid amide or erucic acid amide group) and salts (such as calcium chloride, calcium bromide, potassium bromide, sodium bromide and mixtures of these) (see Summary of Invention on pages 1-2 and claims on pages 4-5).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lungwitz et al. in US Patent Application Publication 2002/0033260 especially in view of WO 98/56497 and Thompson et al. in US Patent 6,302,209. Lungwitz discloses fracturing fluids and methods of using same. The disclosures of WO 98/56497 were discussed in detail above. Thompson discloses various compositions and methods relating to wells.

Disclosed in Lungwitz is a fluid comprising (among other components) a high brine carrier of density preferably from about 1.2 g/cm3 to 1.8 g/cm3 and a zwitterionic surfactant which may be a alkylamidoalkyl betaine like oleamido propyl betaine (see page 1, paragraphs 10-11, page 2, paragraph 18 and page 4, paragraph 43). The brine may contain sodium or potassium bromide, calcium chloride or bromide, or even zinc halides (although zinc halides are not preferred) (see page 2, paragraph 17). When used as a fracturing fluid, a proppant may be included (see page 2, paragraph 23). Additives [presumably could include an energizing gas, see below] may be added at any time or even after injection into a well bore (see page 3, paragraph 25).

Lungwitz also discloses methods of fracturing a formation [using the fluids disclosed] with steps known in the art including pumping the fracturing fluid downhole (see page 4, paragraph 40).

Lungwitz calls out all the limitations of the rejected claims in proper context, except it does not specifically disclose the fluid as energized, any of the specific gases of claim 3, the foam quality in claims 4-5, nor does it the specifically call out use of a betaine containing an erucic acid amide group (although it does generically disclose this material in paragraphs 10-11) as in claim 7. Note that the high density fluid of Lungwitz would inherently allow for fracturing at comparatively reduced surface pressure.

WO 98/56497 discloses fracturing fluids very similar to those of Lungwitz which as discussed above may be energized or foamed with air, nitrogen or carbon dioxide, may contain a erucylamidopropyl betaine surfactant (see page 6, lines 5-8; page 6, line 21 to page 7, line 23; and formula V, page 8 in WO 98/56497). As previously stated, Lungwitz teaches the use of [the fluids disclosed] in fracturing techniques known in the art.

One of ordinary skill in the art would have known of the general benefits of energizing fracturing fluids (such as superior clean-up and lower requirements for expensive chemical components) and would have been motivated to energize the fluids of Lungwitz accordingly, especially in view of the disclosure of WO 98/56497 just discussed. Further such motivation would have been found in Thompson at column 1, lines 57-61, where the general principle that expansion of an energizing/foaming gas

after fracturing promotes better clean-up is disclosed. WO 98/56497 discloses the use of air, nitrogen or carbon dioxide for energizing as stated above.

As to the foam qualities recited in claims 4-5, one of ordinary skill in the art upon deciding to use an energized fluid would have had to select a foam quality to operate from, and it would have been obvious to perform the routine experimentation needed to optimize this parameter. In the course of this work, such an artisan would have come up with the methods of claims 4 and 5 – especially considering that the foam qualities recited are not very specific (at least 25% or 50%). Note that a rejection of these two claims could be made using the same reasoning based on WO 98/56497 alone.

As to claim 7, one of ordinary skill in the art would have noticed the specific recitation of the erucyl acid amide betaine in WO 98/56497 that was generically described in Lungwitz and would have been motivated accordingly to use it in making fracturing fluids.

13. Claims 1-5 and 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Norman et al. in US Patent 5,551,516 in view of Teot et al. in US Patent 4,725,372. Norman and Teot disclose similar fracturing fluids and methods of using same.

Norman discloses a method for fracturing a formation by providing a fracturing fluid and injecting it into a well bore at a pressure sufficient for fracturing (see column 4, lines 51-59). The fracturing fluid comprises (among other components) an aqueous base fluid, a water soluble inorganic salt to inhibit hydration and a thickener amine (see

column 4, line 59 to column 6, line 12). The fluid may be energized or foamed with air, nitrogen or carbon dioxide (see column 10, lines 19-20). The inorganic salt may be (among others) calcium chloride or bromide or a zinc halide. It is noted that if density becomes a consideration, then heavier inorganic salts [or presumably heavier amounts of the ones already cited] could be used (see column 7, lines 45-50).

Norman discloses all the limitations of the rejected claims except for the density and the specific foam qualities of claims 4 and 5. Norman favorably mentions the fluids of Canadian Patent No. 1,185,779 in its discussion of the prior art (see column 4, lines 31-42); this Canadian patent is really a foreign equivalent of Teot.

Teot discloses fluids similar to those in Norman (see column 2, line 24 to column 3, line 20) that may be used in fracturing (see column 1, line 8-12). One advantage cited for them is that they inhibit hydration (see column 1, lines 16-24). The density of these fluids may be as low as about 8.5 ppg (a little over 1 g/cm3), but is preferably from 12 to 21 ppg (about 1.45 g/cm3 to well above 2.0 g/cm3) (see column 3, lines 23-31). Salts are used to provide the desired density of the fluid and may be potassium, sodium, calcium or zinc chloride or bromide (see column 3, lines 32-53).

It would have been obvious for one of ordinary skill in the art to combine the teachings of Norman with those of Teot regarding the use of large amounts of salts in order to minimize hydration. In addition, Norman does suggest that higher density fluids may be desirable (see above), and Teot teaches similar fluids where high density is due to large amounts of the very salts taught by Norman. Further, Applicant admits that

fluids such as those taught by Norman and Teot have had some (if limited) success as the high density liquid phase of foam fracturing fluids (see specification, paragraph 27).

As to claims 4 and 5, after one of ordinary skill in the art combined the teachings of Norman and Teot as described above, it would have been necessary to select a foam quality for the resulting energized fluid to operate from, and the artisan would have done the then obvious, routine experimentation needed to optimize this parameter. In the course of this work, such an artisan would have come up with the methods of claims 4 and 5 – especially considering that the foam qualities recited are not very specific (at least 25% or 50%).

Double Patenting

14. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double

patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

15. Claims 1-10 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-3, 6-7 and 9-11 of copending US Patent Application No. 10/249,943 by England et al. Although the conflicting claims are not identical, they are not patentably distinct from each other.

As to claim 1, claim 11 of the reference falls completely within its bounds (see above for interpreting the steps of claim 11 of the reference to be in any order) and is thus obvious.

As to claim 2, it would have been obvious for one of ordinary skill in the art to combine claims 11 and 3 of the reference in order to determine the optimal method along the lines of density, and the artisan would have performed a method according to claim 2 in the process.

As to claim 3, one of ordinary skill in the art would immediately have thought to use one of the gases of claim 3 (as they are notoriously well known/obvious in the art for energizing) upon reading claim 11 of the reference, and thus would have found the method of claim 3.

As to claim 4 and 5, one for ordinary skill in the art would have found the methods of these claims in the course of optimizing the foam quality of the energized fluid after learning the method of claim 11 in the reference - such optimizing being the obvious thing to do under the circumstances.

As to claims 6-10, one of ordinary skill in the art would have made these in the course of optimizing what can be learned from the teachings of claim 11 in the reference in light of claims 6-7 and 9-10 of the reference.

Note that the cube superscript in the claims of the reference application are taken to be g/cm3 after considering the specification of this application.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent 5,979,555 to Gadberry et al. is similar to Norman cited above. US Patent 6,100,222 to Vollmer et al. and WO 03/048267 recite compositions similar to those used in the methods of the present application with the possible exception of being energized. US Patent 5,785,747 to Vollmer et al. is similar. The last three references mentioned here were cited by Applicant to the Examiner.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to C. R. Richard whose telephone number is 571-272-8502. The examiner can normally be reached on M-F, 8:15 am - 5:15 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on 571-272-1302. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*** C R Richard

PHILIP TUCKER
PRIMARY EXAMINER
ART UNIT 1712